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DISCUSSION OF PROCEEDINGS PAPERS

277, 407, 575, 722

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Discussion of
AERIAL SURVEYS FOR RESERVOIR PLANNING

by Francis J. Guscio
(Proc. Paper 407)

FRANCIS J. GUSCIO,[1] A.M. ASCE—Mr. Dickerson's discussion indicates general agreement with the use of aerial surveys for reservoir planning while advocating the adoption of additional aerial mapping of greater and lesser accuracies to use for more and less extensive site planning purposes than outlined in the paper. The purpose of the paper was to emphasize the applicability of aerial surveys for reservoir planning purposes as actually experienced, particularly when such surveys are properly timed and accomplished during a single series of flights with topography mapped on uniform scales to adequately serve the many planning purposes at reasonable cost.

Mr. Dickerson in the third paragraph of the discussion refers to the use of aerial surveys in areas of the country where no topographic data are in existence, stating that in such areas aerial photogrammetric survey methods are of even more importance there for preliminary planning purposes and can be secured at "low costs." The importance is no doubt true but the costs would be "reasonable" rather than "low." The statement that maps of such areas without any additional field work can be prepared with present-day equipment is not questioned; however, the accuracy and usefulness of such maps would not be dependable enough for reservoir planning as described in the paper. Mr. Dickerson's statement that such maps surpass in accuracy some older topographic maps and closely approach some modern topographic maps is questionable, and preliminary mapping costs "of $10.00 or $15.00 per square mile"may average 50 times smaller than the costs of the maps needed for overall reservoir planning.

In the fourth and fifth paragraphs of the discussion Mr. Dickerson predicts the use of higher accuracy surveys for dam sites, relocations and silt ranges by aerial survey methods which are today successfully producing maps at 1:240 scale with 1 foot contour interval. Since the maps for dam sites and relocations need be only of a scale 1:600 to 1:1200 with 2-foot contour interval his prediction is probably true, providing the costs of such surveys are not unreasonable as compared to the use of accepted ground surveys methods. Since for silt ranges range monuments have to be set following the clearing of the ranges, the same ground survey crew could most likely take the necessary profiles cheaper than they could be secured by aerial surveying.

Mr. Dickerson is correct in his statement that the controlled mosaics referred to in the paper are justified on the basis of making the photographic information available in convenient form, and that "highly accurate" mosaics would not be justified for reservoir planning. The accuracy of the mosaic required should correspond to the accuracy required and tolerated for

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producing the topographic data specified; the scales and contour intervals recommended are stated in the paper. The controlled mosaics can be justified cost- and accuracy-wise for the purpose of land acquisition alone in the southeast.

Regarding Mr. Dickerson's discussion of plotting ownership lines into correct map position during the photogrammetric operation rather than plotting them on the aerial photographs or controlled mosaics after completion, it is extremely doubtful that the "extra effort required" would be "insignificant" in the southeastern part of the country, although it may be practicable to do so in parts of the west where ownerships on regular land lines exist.

Mr. Dickerson's discussion evidences a genuine interest in the use of photogrammetry wherever practicable. His discussion of the paper is appreciated. Certainly, there is a common field of agreement between the paper and the discussion that suitably accurate maps and information are obtainable by aerial surveys and stereoscopic mapping for reservoir planning purposes at reasonable costs.

Discussion of
A GEOMETRIC PROBLEM IN TRAVELING
CRANE TRACK ALIGNMENT

by J. E. Oliver and F. A. Maloney
(Proc. Paper 575)

J. A. OLIVER[1] and F. A. MALONEY[2]—Mr. Hartman's interest and comprehension in the traveling crane track alignment problems is both appreciated and encouraging. Some opposition (not publicly voiced) did not consider the solution a practical one to an interesting problem. However, a section of track has been built using the spiral alignment procedure and, to all reports, is most satisfactory.

The criteria was formulated with certain existing cranes and dock conditions in mind and therefore somewhat influenced by these conditions. Mr. Hartman is correct in his statement that the elimination of the first portion of the spiral increases the gage reduction or "float" action. A switch is usually necessary at the tangent point and to cut down on the switch lead, the long flat portion of the spiral was eliminated.

The fully reduced gage is necessary at the S. C. whenever the length of circular curve is long enough to accommodate the crane (travelling in either direction). If the circular curve is shorter than the equivalent length of crane an adjustment in the gage reduction is necessary.

Mr. Hartman's method of calculating the float action or necessary gage reduction is unique and most applicable when existing conditions do not influence design. Since a sound theory is a good basis on which to approach a practical problem, the refinements suggested by Mr. Hartman will be considered in future criteria and design problems.

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Discussion of
A NEW LOOK AT THE SPECIFICATIONS
FOR FEDERAL GEODETIC CONTROL

by Robert H. Randall
(Proc. Paper 722)

SUMNER B. IRISH,[1] A.M. ASCE—Mr. Robert H. Randall is to be congratulated for sparking this examination of the specifications for Federal geodetic control. Since 1933, when the Federal Board of Surveys and Maps issued "Specifications for Horizontal and Vertical Control," much has happened in this country in the field of surveying and mapping. It is possibly past time for the proposed revision.

There are two reasons, as Mr. Randall points out, for considering, at this time, a revision to the "Specifications for Horizontal and Vertical Control." One is based on the advances in the technology of surveying and mapping, which make attainable higher accuracies of work. The other is based on the demand for more and more control by those, both civilian and military, who need it in carrying out their day-to-day projects.

It is heartening to see the higher standards in the proposed revisions of the specifications, both as to quality and quantity of surveying work, as reflected particularly in the proposed changes for triangulation and traversing. Mr. Randall, however, states that very little revision to the specifications for vertical control has been suggested.

It seems to this writer that the excellent progress feasible in horizontal control specifications can be repeated satisfactorily in the specifications for vertical control. At the present time, the check between forward and backward running between fixed elevations or loop closures is, for first-order work, 4 mm $\sqrt{K}$, where K is the distance in kilometers. The International Association of Geodesy recommends a class of leveling called "high precision" which requires a check of 2 mm $\sqrt{K}$. Our requirements for first-order work should approach those recommended by the International Association of Geodesy.

It can be pointed out, in addition, that equipment is now on hand which makes possible the economic achievement of first-order leveling by the practicing surveyor. If he is to have satisfactory checks on his work he should have higher-order work to tie to than he can normally produce. Therefore, it is believed that first-order leveling should require a closure of 2 mm $\sqrt{K}$ as proposed by the International Association of Geodesy.

Perhaps the argument will be raised that the United States has little work which will qualify according to the definition of "high precision" as stated by the I. A. G. Undoubtedly a rather extensive and expensive program would be required to bring the quality of the major lines of the United States up to the standard of "high precision." However, the question can also rightly be asked, "Is our present status of first-order work something to which this country will be wedded as long as it lives?" There must be a possibility of improving the situation.

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The performance-type specification which is referred to in connection with traversing seems to be highly desirable. It certainly is in agreement with the trend in a vast number of fields to write specifications on the basis of the results that are desired. This is undoubtedly a step in the right direction. If specifications are written intelligently and scientifically, with thought and care, desirable results in a survey will be guaranteed. Specifications which outline step-by-step procedures reflect the art in a field of endeavor, while performance specifications emphasize the scientific aspects. We should strive to make surveying and mapping a science.

Some of the proposed revisions, however, seem to represent a step backwards, particularly, those in triangulation which give strength-of-figure requirements and side equation tests. Will trilateration be ham-strung by these requirements which are peculiar to triangulation? As recommendations these factors are acceptable, but as requirements, no. They unquestionably, however, represent good guides.

The creation of lower orders of accuracy in specifications for Federal geodetic control seems very questionable. Fourth-order can be envisaged as useful to the surveyor working from third-order, or better, work established by one of the Governmental agencies. Fifth-order work seems rather unrealistic, be it for private or public surveys. Specifications are meant to specify - to tell some things that should be done or some requirements that should be met. Fifth-order work as outlined does not specify anything concretely. Therefore, this additional lower quality of work seems rather useless. It has no meaning.

Also, in regard to fourth-order work, there is no requirement for momumenting the points used. This seems falacious. Any and every survey should use points that can be regained. A survey is of greatest use and value if, at a later date, checks can be made of the work and additional lines run from it. Therefore, it is strongly recommended that marking of points be required in this quality of work.

Again it is fitting to point out that it is proper that we are taking a look, after 22 years, at the framework of our surveying and mapping work to see what changes need to be made. Surveying and mapping have come a long way since the last issue of "Specifications for Horizontal and Vertical Control." Changes as to both the quality and quantity in the specifications are inevitable if surveying and mapping is progressing.